REVIEW ARTICLE

ELECTROCONVULSIVE THERAPY EFFECTS ON COGNITION AND MEMORY AND NURSE'S ROLE

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Abstract

Background: Electroconvulsive therapy (ECT) is brain stimulation with a short controlled series of electrical pulses co-administered with intravenous anesthesia. Aims: The aim of this review is the evaluation of electroconvulsive effect as a first and second choice psychiatric treatment associated with memory impairment effects. **Method:** A literature review search took place between 1989 to 2014, concerning aspects and reports of ECT. **Results:** Specifically 27 studies were selected and in nine of those (33.3%) ECT was used as a first choice treatment. Overall 44% (12) of the papers resulted to noticeable cognitive impairment and memory deficits. **Conclusion:** ECT is a life savor treatment for life threatening cases where quick results are needed and where pharmacotherapy has failed, yet a large percentage of authors (44%) conclude that cognitive side effects are noted after ECT sessions.

Keywords: "ECT guidelines", "ECT treatment", "ECT and memory"

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Introduction

Despite the fact that ECT has a 75 year old history the results of this method were worldwide known just after 1970. The reasons for this acknowledgement are: improved therapeutic methods, increased security measures and controllable use of anesthesia. One theory claims that seizure activity caused by ECT duration, results in alteration of brain chemical neurotransmitters. Another theory suggests that ECT treatments affect the normality level of human brain hormones which can, in turn, practically affect patients' energy, sleep, appetite and mood ups and downs according to ECT Handbook[1].

Indications and choice treatment for ECT

According to American Psychiatric Association,[2] indications listed for ECT and especially the treatment of patients with major depressive disorder include psychotic depression, catatonic stupor, severe suicidality, food refusal leading to nutritional compromise and other extreme psychiatric situations where a rapid definitive response is required. The Association also recommends ECT for patients who have previously shown a positive response to it and for those who have medical conditions that prevent the use of antidepressant medications and finally where the risks of other available therapies are greater than the risks of ECT.[3,4,5]

ECT choices of therapy

As it was previously mentioned numerous trials have taken place in order to show ECT indications and appliances in psychiatry. ECT is considered as first choice therapy in:

1. Severe depressive episode and severe psychomotor retardation (relating problems concerning food and water intake and general patient physical worsening).[6]
2. Treatment resistant depression in patients, in other words failure to respond to two consequent tricyclic antidepressant cycles of standard doses lasting 6 weeks or more.[7,8,9]
3. Stupor and catatonic depression where the patient remains entirely motionless, speechless and with negativeness.[10]

ECT as a second choice treatment in:

1. Major depression in aged patients, taking into account psychical illness because of anesthesia related risks.[11]

2. Major maniac cases, which are related with physical burnout life threatening cases and did not respond to therapy.[12]

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3. Patients with schizophrenia where clozapine therapy either seemed inadequate or impossible to comply with.[13]
4. Parkinson disease with decrease of kinetic symptoms.[14]
1. Neuroleptic malignant syndrome (NMS) with severe morbidity, mortality and contradictory results. [15,16]
2. Patients with both dementia and depression. [17]
3. Down syndrome and specifically when antlaaxonic arthritis is stable. [18,19]
4. Patients with both intellectual disability and depression with better response when biological or psychotic features were present.[20]

ECT process

ECT is administered with general anesthesia and the electrode placement is divided mainly in two categories: bilateral and unilateral. In bilateral, electrode patches are placed on both hemispheres of patient head while electrical stimulus is between 25-50mc to 750-800mc. In unilateral, patches are placed in one hemisphere and in many cases it is preferred, because the unwanted effects from ECT such as memory impairments are scarce. Yet bilateral has a quicker response and drives to full patient recovery especially in cases such as catatonia.

Number of ECT sessions

Minimum number of therapeutic sessions is considered number six because from this number and on clinical improvement will or will not show.[21] Furthermore, the number of sessions can also be limited in order to control the unwanted effects such as memory impairments from three times a week to two according to therapy. If temporary improvement is succeeded, for example resolving catatonia syndrome then therapeutic sessions continue to a maximum of number 12. Reasons for exclusion from ECT sessions are according to American Psychiatric Association, conditions associated with increased risk of appliance such as: severe pulmonary or unstable cardiovascular disease, elevated intracranial pressure, stroke, vascular aneurysm and ASA (American Society of Anesthesiologists) Class 4 or 5.

Nurse's role

According to the ECT Handbook of the Royal College (third edition)[22] some of the nurse's duties during an ECT session are

basically to provide advanced clinical care before, during and after ECT procedure, reduce patient stress through adequate patient information and support their families during the whole process. In order to achieve these tasks, a nurse has to have a full knowledge of the adverse effects, indications and contraindications of ECT process. However nursing education upon ECT appliance and procedure are areas not fully addressed according to Arkan,[23] Byrne[24] and Wood[25]. If nurses were trained adequately in order to make a difference in ECT procedure then practically they could provide adequate feedback to the patient, families and ECT team as well. Consequently a thorough report of ECT choice therapy, stability and side effects provided to the nurse's specialized in ECT would be a useful tool for better assessment and documentation of the ECT procedure.[26]

Aim

The aim of this paper is an informative one, meaning to acknowledge and evaluate a) when ECT is considered a first and a second choice treatment and b) what its memory and cognition effects are on patients.

Methods

For this review 27 literature reviews and clinical trials were included. Papers which did not refer to data such as ECT duration, type and effects on memory were excluded. Some of these studies though, were used for bibliography reasons. The author searched Medline, Embase and Cochrane Register of Clinical Trials including studies between 1989 to 2014. Key words which were used were: ECT guidelines, ECT therapy, ECT treatment and combination of the previous. Specifically 44 studies were identified but only 27 were used, those which were relevant to the topic. Additionally this paper uses a dimensional approach rather than a categorical one increasing reader acceptability.

Results

According to the results a total of 27 different papers were included. Parameters such as whether ECT was considered a first or second choice treatment, stability, memory and cognition effect, ECT type of appliance (bilateral or unilateral), study type and number of participants were inserted to the study.

More specifically it was indicated that in 33.3% (n=9) of the studies, ECT was used as a first choice treatment for major

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depression, treatment resistant, or catatonic. There was also another 26% (n=7) of the studies in which ECT was used as a second choice treatment in major depression in the elderly after one or two cycles of pharmacotherapy while in the rest papers 37% (n=10) ECT was a second choice therapy in schizophrenia, mania etc. Additionally only 9 papers (33%) of the total referred to stability of the antidepressant response induced by ECT and among these at least 3 papers (11%) showed stability which lasted from 6 months to two years whereas in the other 6 papers (22%), stability effect was shorter than 6 months. Memory and cognition impact were observed in 66% (n=18) of the studies. It was found that around 44% (n=12) of the papers mentioned adverse effects such as amnesia or claimed cognitive impairments while in the rest 22% (n=6) improvement was noted. Resolution of dementia symptoms and cognitive improvement were also found when ECT was applied in neurological diseases such as Alzheimer in 7% (n=2). Finally nearly 37% (n=10) of the papers are referring to the type of the stimulus electrodes used (bilateral and unilateral) and from those 29.6% (N=8) mentioned that there was greater impairment in bilateral than in unilateral.

Discussion

As foretold this study is an effort to explore different and similar views of authors concerning ECT, as great controversy exists considering the difference between bilateral and unilateral ECT, duration of therapeutic results and cognitive effects in memory. A lot of psychiatrists use ECT as a first choice treatment in catatonia and as a second choice treatment after one or two cycles of pharmacotherapy and especially when drugs do not have the immediate results patients and psychiatrists long for. As reported by Bush[27] the motor signs of catatonia can be relieved by sedatives and two sessions of ECT, a method which is considered ineffective for schizophrenia. Additionally ECT is a therapy mainly used for resistant depression. When the adequate drug dose is not enough and patient compliance is an issue then a depressive disorder diagnosis is defined. Nowadays however there are not so many solutions to confront resistant depression. ECT was and still remains, psychiatrists' last choice of treatment. Furthermore this study is also in agreement to Pagnin,[28]

who considers ECT, a valid therapeutic choice treatment for depression.

However relapse or recurrence of psychiatric symptoms are common, but so is patient response to treatment. The stability of response of this review agrees also with Segman[21] where relapse rate may exceed 50% in the first 3 months. Tharyan[29] in a previous study also suggests that generally people with schizophrenia can be improved in *short term* with ECT but combination with pharmacotherapy after the end of the treatments also helps. Individual patient characteristics must also be explored in order to predict which therapy suits best with each patient according to Kellner.[30] Additionally there are other factors that are related with relapse rate such as continuous monotherapy or combination of antidepressant medication before and after ECT, period of trial and quick response to ECT, parameters that are not taken into account in the specific study.

It may be questioned whether the choice of ECT (bilateral or unilateral) had any effects on cognition. Robertson[31] suggests that the significance of amnesia depends on different factors such as the exact time the patient has been tested after ECT for example three hours or 24 hours afterwards, whether he/she has taken an IQ test beforehand and if there was any memory assessment after at least 6 months to a year as it allows for optimal identification of permanent cognitive deficits and better assessment of retrograde amnesia. Among limitations of this literature review were, differences among patients in the treatment received which were not determined such as age, gender, number of administered ECT and level of dosage, factors that contribute to greater cognitive deficit but the study generally agrees with the fact that bilateral electrode placement resulted in more severe and persistent cognitive deficits.[32] Additionally this paper agrees with Rose et al.,[33] and Service User Research Institute[34] where cognitive impairment and memory loss, affects 30% of the patients. Tharyan[35] in a future study also implies a slight memory impairment resulting from ECT without referring to the electrode placement while O'Connor[36] supports the conclusion that bilateral is so effective in controlling depression as median dosed unilateral ECT. Furthermore as foretold this paper agrees also with Sackeim[37] who claims that high dosage of unilateral ECT is as effective as bilateral but produces less severe and less persistent cognitive effects.

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In conclusion when it comes to speak about ECT it has to be understood that when psychiatrics want to minimize the intellectual side-effects of treatment, then unilateral ECT is preferable. On the other hand when the speed of clinical improvement is paramount as in life-threatening depressive illness, then bilateral ECT may be preferred.[38] However prospective patients should be warned of the significant risk of permanent amnesia and the possibility of permanent memory and cognitive disability. Rose[39] also refers to the information provision procedures of the patients who are receiving ECT and approximately 30% of them believe that they have been induced to have the treatment.

Fisher[40] additionally claims that consenting to ECT should change because patients agree that they feel a lack of choice. One way to overcome this, is for health personnel, *such as nurses*, to be educated as mentioned above and inform psychiatric patients properly before signing an informed consent. It is also suggested that psychiatric assessment of patient's self-reports of memory difficulty could be incorporated throughout ECT course (meaning before, during and after ECT treatment) in order to detect ECT-related cognition changes[41] and so end treatments or switch bilateral to unilateral.

Patient Consent

Prior of ECT, legal issues arise, such as patient consent mainly in people with learning disabilities which are deprived from the ability to give an informed consent. In these cases doctors should evaluate patient's ability to uphold and understand the information for a specific amount of time prior to the final decision. Yet in cases of emergency, ECT is applied without the patients' consent as it is considered a first-line treatment, especially when a person is suicidal, psychotic, not eating or catatonic (immobile). In any other case the patients should be adequately informed about the benefits and side effects of ECT before signing the relevant consent document.[42, 43]

Conclusion

Despite the fact that ECT has proved, throughout the years, to be helpful towards patient's psychiatric treatment, it is mentioned that its impact on patient's life can have a detrimental effect. Memory loss was and still remains,

unfortunately, one of ECT's well known outcomes. Further research should take place in order to minimize knowledge deficits after ECT sessions. Health professionals should be more careful about informed consent in order to achieve maximum care and patient satisfaction. In this way ECT treatment could result to a therapeutic mean without any poor consequences.

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